earliest (1875-76) was with Prof. Schäfer, and related to his experiments upon Medusæ. In these letters he describes many interesting results which he was obtaining, and which were, for the most part, afterwards published in the *Philosophical Transactions.* He had then and always the pen of a ready writer (in hand as well as in tongue), and was besides in the habit of illustrating his descriptions by rough diagrams, so that they are admirably clear and instructive. Nearly all the other letters to scientific men are of comparatively recent date, and deal mainly with the controversies on problems of inheritance (physiological selection and Weismannism) in which, as the readers of NATURE well know, he was so deeply engaged. His paper on physiological selection[1] was read before the Linnean Society in May 1886. It raised a storm of opposition, largely, as he thought, because its opponents would not take the trouble to understand it. To Prof. Meldola he writes :

> Physiological selection seems to have brought a regular nest of hornets about my head. . . . It seems to me that there is a good deal of misunderstanding abroad, due, no doubt, to the insufficiency with which my theory has been stated.

There are also several long letters to Mr. Thiselton-Dyer and Mr. Francis Darwin on the same subject, and a friendly controversial correspondence with Prof. Poulton on the subject of Weismannism. But most of these letters have a more or less continuous thread of argument running through them, and do not lend themselves readily to extracts. The reader who is interested in the controversies is therefore referred to the originals. Even after he had been stricken by paralysis he was not to be deterred from continuing to discuss the problems which most interested him, and he carried on a long correspondence with the Rev. G. Henslow on the subject of the direct action of the environment on plant structures. In his last illness the personal sympathy which he received from his scientific friends much touched him, hard though he felt his fate to be. In a letter to Mr. Thiselton-Dyer, dated September 1893, he writes :

> When one is descending into the dark valley, scientific squabbles seem to fade away in those elementary principles of good will which bind mankind together. And I am glad to think that in all the large circle of my friends and correspondents there is no vestige of ill will in any quarter, unless it be with —— and ——, who both seem to me half-crazy in their enmity, and therefore not of much count.
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> As for "fortitude," sooner or later the night must come for all of us ; and if my daylight is being suddenly eclipsed, there is only the more need to work while it lasts. But, to tell the truth, I do not on this account feel less keenly the pity of it. With five boys—the eldest not yet in his teens and the youngest still in his weeks ; with piles of note-books which nobody else can utilise, and heaps of experimental researches in project which nobody else is likely to undertake, I do bitterly feel that my lot is a hard one.

Throughout the letters the character of the man comes openly to the surface, and all the world may see in them the simple child-like nature, the unvarying good humour, the gentle disposition, which were combined in him with the highest intellectual attainments ; qualities which won for George Romanes the affectionate regard of all who were privileged to know him.

E. A. SCHÄFER.

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[1] An admirable epitome of this theory (and of each one of the scientific subjects which chiefly engaged Romanes' attention) is given by his biographer in the book before us.

EARLY LEGENDS AND PREHISTORIC FOLK-LORE.

The Life and Exploits of Alexander the Great; being a Series of Translations of the Ethiopic Histories of Alexander by the Pseudo-Callisthenes and other Writers, with Introduction, &c. By E. A. Wallis Budge, Litt.D. Pp. xv + liv + 610. (London : C. J. Clay and Sons, 1896.)

WITHIN recent years it has been recognised that the legends and epics of ancient peoples are something more than collections of quaint and amusing tales, that they have a scientific value, and that they yield important results when studied, classified, and compared. The sagas of many nations are well known, and have been already subjected to an exhaustive process of inquiry, but those of others have still to be unearthed. Among this latter class the legendary literature of the Ethiopians had until recently to be set, but the volume by Dr. Wallis Budge, the title of which stands above, will go some way to remove the obscurity in which the beliefs and traditions of that nation have been shrouded. Hitherto the Ethiopic literature that has been published, has in the main been biblical and of interest chiefly to biblical students ; Dr. Budge, however, has collected a goodly body of Ethiopian traditions from MSS. in the British Museum and in the Bibliothèque Nationale, Paris, two of the former having been among those which were brought to England from the Treasury of King Theodore by the British Army in 1868. The Ethiopic texts of these MSS. have been edited by Dr. Budge, and they have been printed for private circulation by Lady Meux. An English translation and introduction which accompanied the text has, however, been published separately on smaller paper, for the use of those to whom the subject-matter, rather than the text of the MSS., would be of interest ; and it is with some of the results to be obtained from a perusal of this latter volume, that we propose in the present article to deal. It is not our purpose, however, to treat the legends from a literary point of view ; our object is rather to extract from them such information as will indicate what was the condition of geographical and astronomical knowledge among early Oriental nations, and to notice briefly the stories of heroes and others which grew up when the world was yet in its childhood, and when early man was himself still mystified by the phenomena of nature he beheld around him.

The central figure round which the stories group themselves is Alexander the Great, many of them being based on traditions or stories borrowed originally from other races. For instance, the book comprises the Ethiopic version of the Pseudo-Callisthenes, which has found its way into many languages ; extracts from the Ethiopic versions of larger historical works by Al-Makîn and Abû Shâker, Arabic historians of the thirteenth century ; and an extract from the Ethiopic version of Joseph ben-Gorion's "History of the Jews." The book also contains a short account of Alexander's death, and the utterances of the sages thereon ; the "Christian Romance," which is probably an original Ethiopian work ; and an account of the "Vision of Abbâ Gerasimus." None of the Ethiopic MSS. which contain these works is actually older than the seventeenth century ; they are, however, copied from originals which must be put back many hundreds of years, and some of the legends that are inserted are of primeval antiquity.

Among all races, and especially in the East, the figure of some great national conqueror has always served as a centre around which floating legends and stories have gathered. An historical kernel no doubt underlies the mass, but it has been overlaid with numberless accretions, comprising some ancient legends to a certain extent the common property of all races, and others the special product of the race to which the writer belonged. Each nation that has retold the story of Alexander has modified and added to it to suit its own national ideals, so that the epic in its various forms comprises legends, the sources of which range from traditions of the ancient East down to those of mediæval Europe. Thus in the history of Alexander we find the ancient legends of Babylon have been laid under contribution. Alexander makes himself small, and flies through the air on the back of an eagle, exploring the heights of the heavens, "the beauties and the terrors thereof, and the stations of the birth and the going forth of the stars," in the same way as the Babylonian hero Etana flew to heaven with the eagle, who described to him the fashion and likeness of the earth as it seemed to recede from under them; and the same legend seems to be reproduced in another form in the "Christian Romance" (p. 474), when Alexander sends scouts from the Country of Darkness to the Country of the Living by making them ride on the backs of eagles. Alexander, too, is related to have travelled in the same regions, and to have met with the same adventures as the Babylonian hero Gilgamish; while his slaying of the dragon is clearly a reminiscence of the fight of the Babylonian god Merodach with the monster Tiâmat. As an instance of the way one of his Ethiopian biographers has incorporated material from contemporary sources, we may mention the story of the musical city (pp. 457 *ff.*) which Alexander at first cannot take, as his soldiers, after scaling the walls, are overcome by the beauty of the music produced by cunning contrivances of brass, to which figures of brass continually danced—a story which probably reflects some mechanical invention famous at the time of the writer.

The travels of Alexander furnish ample opportunities for the display of his biographers' knowledge or theories concerning geography and the extent and formation of the world. Thus, when travelling in the neighbourhood of Armenia, Alexander "came down to a very great mountain gate (*or* pass) wherein were many large roads by which merchants travel." Alexander makes inquiries, and he is informed by certain sages that the mountain only "ends at the sea that surroundeth the world, that is to say the sea Bôntôs (Pontus)," and this leads to a description of the far East and the nations who were said to dwell there. The same mountain, which was supposed to surround the world "like a ring," is referred to in another passage by the angel whose duty it is to hold it firm, and who describes it as "the father of all the mountains which are upon the earth," and adds that if plucked up by the roots the destruction of the earth would follow. Another curious geographical conceit occurs in an account of the origin of the Dead Sea, which is said to "stink horribly," because of the dead bodies of men and women and the carcases of beasts and birds which lie in its depths, whither they were brought by the waters of the Flood.

We gather, too, some interesting details concerning the ancient practice of magic and astrology. For instance, Aristotle is recounted to have presented to Alexander talismans to protect him against his foes, to enable him to enter fortified cities, for supplying him with water in the desert, and for protecting him and his army against fatigue. He also gave him certain amulets with somewhat similar powers, and furnished him with a device for destroying his enemies by means of waxen figures:

> "And Aristotle also made for Alexander a chest, and he placed therein figures which were made to represent his enemies, and they had leaden swords, which were curved backwards in their hands, and which they held downwards, and bows the strings of which had been cut; and he placed them in the box with their faces turned downwards, and he nailed them down with iron pegs and fastened the box with an iron chain."

Alexander had to keep the box carefully, and by laying his hand on it, and reciting certain prayers, he was assured of success against his foes. Aristotle is also credited with a knowledge of astrology, for he compiled for Alexander

> "a number of tables, that is to say, plans or drawings, wherein a star showed the time when he should go forth against his enemies . . . and he spake unto him, saying, 'Know, O King, that the stars are the head and foundation of the dispensation of this universe, and that it is by means of them that the world which is beneath the lowest heaven of the moon standeth. Know too that a certain section of the starry vault ruleth over each district and country on the earth. Now the portion that is over Persia hath therein the planet Mercury, and its regent is Venus, and its guardian is Jupiter, and its adversary is Saturn, and the star which hath dominion over it and worketh misery therein is the planet Mars, but the Sun keepeth it in safety, and the Moon giveth it strength and power. And each of these seven planets hath power over its fortune and over its days; therefore, O King, do thou direct thy course by the dispensation of the planets Saturn and Mars, and by the spiritual force which is in them, so that thou mayest be victorious over thine enemies thereby.'"

In the course of a review it is impossible to do more than briefly indicate the value of but a few of the legends and beliefs to be found throughout the 600 pages covered by the English translation. Reference, however, at least should be made to the stories of the magic stone, the fishes and the water of life, Alexander and his diving-bell, the monsters of the deep, Alexander's converse with beasts and birds, and the ride of Gerasimus upon the lion. The material here collected is, in fact, of great interest from many points of view, and not least from that of the student of folk-lore, who will find much useful information in the notes in which Dr. Budge has worked out the origin of many of the legends incorporated or referred to in the text. Our knowledge of ancient and mediæval science and superstition is gradually becoming more extended, and we venture to think that the volume before us will do much to help on the study. To summarise the universal character of the epic of Alexander, we cannot do better than quote Dr. Budge's own words:

"Given a brave, fearless soldier marching with an army through a certain country for conquest and pleasure, it seems that the same stories must be told of his progress and exploits, whether he be Etana, Gilgamish, Nimrod, or Alexander. With the advance of time the first tolerably accurate descriptions of his life will be first distorted and then enlarged, and when he has become a mere memory his name will be made a peg on which to hang stories, legends, and myths. The details of the fabulous history of such an one will be modified to suit the country and ideas of the people among whom the writers live, and eventually it will become the popular expression of the national views of each country through which the history passes of what a hero should be. This is exactly what has happened to the Alexander story in the hands of Semitic and other writers. The Egyptians made Alexander the son of an Egyptian king, and a worshipper of Amen; the Greeks made him the type of the victorious Greek conqueror; the Persians made him a Persian; the Arabs made him a servant of Allah; the Syrians made him a Christian; and the Ethiopians depicted him as a believer in the Trinity and in the Christian doctrine of the resurrection of the dead."

FISHES, LIVING AND FOSSIL.

Fishes, Living and Fossil: an Outline of their Forms and Probable Relationships. By Bashford Dean, Ph.D. Pp. xiv + 300. (New York and London: Macmillan and Co., 1895.)

DR. BASHFORD DEAN is known to zoologists, first, as the author of exhaustive and critical articles in the publications of the United States Fish Commission, on the systems of oyster culture pursued in Europe, and, secondly, as an embryologist who has lately been doing good work on the development of various Ganoid fishes and the comparison that may be instituted with Teleostei. His recent addition to the well-known "Columbia University Biological Series," now being brought out by Macmillan and Co., under the editorship of Prof. H. F. Osborn, is an interesting volume upon fishes, in which considerable prominence is given to the fossil forms, and the whole subject is presented to us from the point of view of the evolutionist. This is the characteristic feature of the book. From the very first page of the introduction to the last page in the volume, preceding the index, which is a table of the supposed descent of the groups of fishes, the book is full of the spirit and the language of evolution.

The fossil forms are introduced in their places amongst the living members of their group, and the plan of treatment of the groups in each chapter may be exemplified by No. vi., dealing with the Dipnoi, where we have first a short account of the lung-fishes, then the description of their structural characters, with an account of the fossil and of the living forms, and finally a discussion of their phylogeny and relationships with other groups. The figures in all parts are numerous and good, and many of them original.

The classification adopted is in the main that of Smith Woodward, in which the class Pisces excludes the Marsipobranchii (not that these are excluded from the book), and includes as sub-classes the Elasmobranchii, the Holocephali, the Dipnoi, and the Teleostomi. Our author considers then the Chimæroids as a distinct group equivalent to Elasmobranchii and Dipnoi, but adds: "The kinships of the Chimæroids seem unquestionably nearer the stem of the sharks than that of other fishes." He considers that the lung-fishes (Dipnoi) as a group "may not unreasonably be looked upon as descended from the primitive Elasmobranch stem." They are "an advancing phylum from which the amphibians may early have diverged." The remarkable fossil Arthrodira (*Coccosteus*, &c.), he follows Smith Woodward in considering provisionally as an order of extinct and highly-specialised lung fishes. A fine figure of the head of the giant predatory member of the group *Dinichthys intermedius*, one-tenth of the natural size, forms the frontispiece. These forms are now dissociated from *Pterichthys* and other lowly Ostracoderms, and also from the Siluroids, with which at various times they have been compared, and are united with the Dipnoi. The author believes, however, that the Arthrodirans may almost as well be referred to the sharks as to the lung-fishes, and that they may, perhaps, ultimately come to be regarded as worthy to rank as a distinct class. Dr. Dean builds his phylogeny largely on the solid basis of Palæontology.

After the systemic part of the book comes a chapter on development, in which, in addition to general remarks on eggs and breeding habits, a brief but adequate account is given of the embryonic and larval development of the five types—Lamprey, Shark, Lung-fish, Ganoid, and Teleost, with the view of contrasting the groups of fishes. This section includes a summary of Semon's observations on *Ceratodus*, and is illustrated by useful figures.

Throughout, structure is treated largely from the developmental point of view, which adds to the value, interest and freshness of the book. The author sums up against Gegenbaur's archipterygium, and in favour of the derivation of paired fins from lateral fin-folds. This view is supported by the simple condition of the pectoral and pelvic fins in the ancient fossil shark *Cladoselache*, the knowledge of whose archaic characters we owe to Dr. Dean himself. The vexed question of the precise function of the sense organs of the lateral line is still left undetermined. Beyond "feeling," in a broad sense, the author merely suggests "the sensory tracts along the sides of the body are certainly well situated to determine the direction of the approach of friend, enemy or prey." It is interesting—even if one can scarcely help feeling slightly disappointed—to read that: "It must for the present be concluded that the pineal structures of the true fishes do not tend to confirm the theory that the epiphysis of the ancestral vertebrates was connected with a median unpaired eye." He considers rather that the epiphysis was connected with the innervation of the sensory canals of the head.

At the end of the book we find a list of derivations of names, a good bibliography classified under groups and systems of organs, and, lastly, a series of tables giving in contrast form a statement of the comparative anatomy and embryology of the different groups of fishes, illustrated, like the rest of the work, by a series of clear figures drawn from the best sources, and many of them original. No doubt specialists on fossil fishes will be able to find defects and omissions, but for the ordinary student of the subject Bashford Dean's volume will prove useful and interesting.

W. A. H.